From: GT700@dnvps.com [mailto:GT700@dnvps.com]
Sent: Friday, July 12, 2013 3:30 PM
To: tec-fpmc@fpg.com.tw
Cc: FPMC28 - Data (G Mail); FPMC 28 Vessel Control Group; albert@fpg.com.tw
Subject: FPMC 28, FUEL ANALYSIS REPORT, BALBOA, 28-JUN-2013, SAMPLE : HOU1317119 - NOTE: SULFUR ABOVE 1.00%

To: FORMOSA PLASTICS MARINE CORPORATION
Attn: Mr SU WEI-CHIH
Attn: Albert

Cc: The Master Of 'FPMC 28'
Attn: Chief Engineer

Cc: V.SHIPS (ASIA) PTE LTD
Attn: Vessel Control Group

DNV Petroleum Services - Fuel Analysis Report dated: 12-Jul-2013

Vessel: FPMC 28 (9528378)

Sample Number	HOU1317119
Product Type	(HFO)
Bunker Port	BALBOA
Bunker Date	28-Jun-2013
Sampling Point	SHIP MANIFOLD
Sampling Method	CONTINUOUS DRIP
Sent From	PANAMA CITY, PANAMA
Date Sent	09-Jul-2013
Arrived at Lab	11-Jul-2013
Supplier	BP
Loaded From	VAALS
Quantity per C.Eng.	400

Seal Data DNVPS, SEAL INTACT, 7366889

Related Samples

Supplier	7366890
Ship	7366891
SHIP MARPOL	7366892
MARPOL	150451

Receipt Data	Unit	
Source Of Data		B.D.N
Density @ 15°C	kg/m³	989.6
Viscosity @ 50°C	mm²/s	360.0
Sulfur	% m/m	1.00
Volume @ 60°F	bbl	2547.310
Quantity	MT	400.183

Test Parameter	Unit	Result	RMG380	
Density @ 15°C	kg/m³	988.7	991.0	
Viscosity @ 50°C	mm²/s	359.0	380.0	
Water	% V/V	0.2	0.5	
Micro Carbon Residue	% m/m	12	18	
Sulfur	% m/m	1.09	3.50	
Total Sediment Potential	% m/m	LT 0.01		0.10
Ash	% m/m	0.04	0.15	
Vanadium	mg/kg	47	300	
Sodium	mg/kg	19		
Aluminium	mg/kg	23		
Silicon	mg/kg	22		
Iron	mg/kg	17		
Nickel	mg/kg	27		
Calcium	mg/kg	16		
Magnesium	mg/kg	2		
Zinc	mg/kg	1		
Phosphorus	mg/kg	1		
Potassium	mg/kg	LT 1		
Pour Point	°C	LT 24	30	
Flash Point	°C	GT 70	60	

Calculated Values

Aluminium + Silicon	mg/kg	45	80
Net Specific Energy	MJ/kg	40.79	
CCAI (Ignition Quality)	-	850	
Quantity (Weight)	MT	399.816	
Quantity Difference	MT	-0.367	

Note:
LT means Less Than, GT means Greater Than.
Quantity (Weight) is based on BDN Volume, DNVPS Density and a weight factor of 1.1 kg/m³ (ASTM D1250-80 Table 56).

Specification Comparison :

Results compared with amended ISO 8217:2005 specification RMG380, table 2. Based on this sample the specification is met.

Note: Sulfur has been retested and confirmed.

Operational Advice :
Approximate fuel temperatures:

Injection:
140°C for 10 mm²/s
125°C for 15 mm²/s
115°C for 20 mm²/s
110°C for 25 mm²/s

Transfer :
45°C

Sulfur - Based on this commercial sample and the sulfur content specified on the BDN, the fuel oil is potentially non-compliant if used within a designated Emission Control Area (ECA, ref. MARPOL Annex VI Reg. 14(4)). It is recommended that the situation is recorded through a notification or Note of Protest (NoP) issued by the Master. Only the relevant official authorities can then advise on any further action necessary. Please note that the official MARPOL sample provided by the supplier is the governing sample regarding the compliance with this statutory requirement. For assistance issuing the Note of Protest, please refer to DNVPS' Instruction Manual.

Fuel contains abrasive contaminants as indicated by Aluminium + Silicon. Efficient centrifuging of the fuel is most important in order to reduce the abrasive contaminant to an acceptable level.

Maintain fuel temperature at 98°C at separator inlet and use reduced flow rate. Consider to operate separators in parallel. Please refer to manufacturers instructions for further information.

Based on Aluminium + Silicon content, we recommend to send a set of FSC samples to assess the efficiency and confirm optimum operation of the fuel treatment plant. As a minimum, representative samples taken before and after the separators are required for this assessment. Red labels should be used for the FSC samples. Please refer to the Instruction Manual included in the sample kits for more detailed information.

Best Regards,
On behalf of DNV Petroleum Services Pte Ltd
Qamar Hussain
Technical Advisor

End of Report for FPMC 28

NOTE: Please note that our lab in Oslo is no longer in operation. The latest revision(revision 25, November 2012) of our Air Courier Directory contains instructions on which lab samples should be sent to. Reporting may be delayed for samples that from now on arrive in Oslo. If you have any questions or do not have the latest version of the air courier directory onboard, please contact your nearest DNVPS office.

For technical or operational advice or further information on this report please contact your nearest DNVPS office or contact us directly at
Tel : +1 (281) 470 1030
Email : Houston@dnvps.com